FACULTY OF ENGINEERING, MATHEMATICS AND SCIENCE QUALITY REPORT (2016-17)

1. EXECUTIVE SUMMARY

For the Faculty of Engineering, Mathematics and Science (FEMS), 2016-17 was characterised, in many respects, by a shift change in mind-set, approach, and planning – most notably in our approach to undergraduate teaching and in student recruitment and business planning.

Undergraduate teaching:

The Faculty engaged proactively with the Trinity Education Project (TEP) throughout the year. The defining outcome of this engagement was the complete modernisation of undergraduate, general-entry science recruitment.

In response to the 2015 Programme Review for Science (TR071), followed by the multi-disciplinary work of the Undergraduate Science Education Working Group throughout 2016-17, the revamped four-stream Science programme was launched by Nobel Laurate (Physiology or Medicine, 2015) Prof William C. Campbell in December 2017. The first Junior Fresher entries will be accepted in September 2018. The new steams will see benefits for both staff and students, including streamlining the management of the course, simplification of moderatorship choices, modelling of clear career pathways, and an overhaul of the examination methods.

The non-science Schools are also well along the path of integrating TEP principals into their existing courses and programmes. The challenge for Schools with professionally accredited courses is to maintain the requirements of the external bodies while simultaneously providing scope to incorporate TEP principles, such as broad curriculum options.

Within the Schools of Engineering and Computer Science and Statistics, a major achievement during the year was the accreditation of Computer Science and Computer Engineering programmes by Engineers Ireland, the professional body with statutory responsibility for the accreditation of professional engineers in Ireland. Accreditation of the Masters programmes (MCS and MAI) was obtained for the first time. The accreditation is valid for 5 years and represents a major affirmation of the quality of the programmes.

Student recruitment and business planning:

FEMS actively encourages young people to consider courses and careers in science, technology, engineering and mathematics (STEM) through School outreach programmes, highly sought-after transition year courses and maintaining a presence at key national exhibitions and seminars.

Although applications for STEM courses were higher nationally in 2016/17 than they were a few years ago, FEMS is unable to offer places to all its qualified applicants. The E3 proposal, a joint venture designed to complement the expertise of the Schools of Computer Science and Statistics, Engineering, and Natural Sciences, is an accelerated response to the demand for additional engineering and ICT places.

To meet E3 expectations, the student body in the three Schools will see an expansion in excess of 50%. The challenge of meeting the expansion without sacrificing the high quality of the programmes has necessitated a shift change in the Faculty's approach to both student recruitment and marketing.

The Faculty has regularised coordination of NEU recruitment with the Global Office by establishing the FEMS Global Strategy Group (GSG). Meeting monthly, key Global personnel give timely updates on partnerships, student mobility, NEU applications and international recruitment drives. This allows FEMS the opportunity to feed into these strategic approaches. All Schools have appointed a Global Champion, who acts as a first-contact point between Global and staff on the ground.

With the aid of an external consultant, FEMS has conducted an extensive analysis of our course offerings, websites have been updated and extraneous materials removed, and a Global Officer for Life- and Bio-Sciences is currently in recruitment.

An unexpected bonus of this in-depth analysis of our courses has led us to develop a greater understanding of the programmes we offer, while reinforcing the necessity of maintaining the quality and unique selling-points of our offerings. It is the quality of our courses which attracts so many applicants in the first place and makes graduates so sought after by industry.

Athena Swan: The Faculty aims to achieve Athena Swan awards in five of our eight Schools in the next 18 months. The majority of Schools have now appointed an Athena Swan champion to lead this push towards accreditation.

Risk register: Following pilot projects in the Schools of Chemistry and Computer Science and Statistics, all FEMS Schools have begun the process of establishing a School Risk Register. The Office of the COO has been providing resources to help the Schools in the initial phases.

Website: The coordination of the undergraduate science websites remains an issue, and may be considered a barrier to the recruitment of NEU students in particular. This is a key issue to be resolved in the coming year.

Subject rankings: The subject rankings released in 2016-17 were not applicable. However, the 2017-18 rankings show the Faculty on an upward trend, but not yet returning to the peaks achieved in mid-2000s.

Space: The quality of many spaces across the Faculty remains a great concern. In particular, the unsuitability of Goldsmith Hall is almost a ubiquitous feature in School/Programme reviews and student feedback.

Technology enhanced teaching: Led by the Faculty Administrator in AHSS, 16-17 saw an additional 32 members of FEMS staff enrol on the ResponseWare (Clickers) project. Feedback from students is extremely favourable, and the new App approach is efficient and economical. This project fits nicely with the TEP approach, and it is to be hoped additional staff members partake in future years.

The Quality process: The Faculty would be in favour of amending the current timeframe for the collation and presentation of the Faculty Quality Report to the Quality Committee. For an optimal report, the background surveys and reviews should all correspond to the same academic year. This would allow School responses to be consistent across years and therefore comparable for cross-referencing. This is particularly noticeable in the case for the ISSE report (School responses in this report is based on the 2015-16 ISSE, as by the time the 2016-17 ISSE received approval from the Quality Committee FEMS Schools had already complete their response templates. Information from 24 months ago is out of date). FEMS would ask that the Quality Committee re-evaluate the timings of both the background and the Faculty reports.

Looking forward:

The big challenge for the years ahead is balance – maintaining our upward trends in student recruitment, the introduction of new courses and new capital projects while maintaining and enhancing our teaching, learning and research standards.

Our key challenges for the coming year are diversity in student recruitment, Athena Swan accreditation, approval at key College Committees for the E3 project, and the smooth incorporation of TEP principles into the FEMS programmes.

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Professor Vinny Cahill
Dean of Faculty of Engineering, Mathematics and Science

2. QUALITY REPORT

2.1 School precis

This year, seven of the eight Heads of School provided a precis of the priorities, challenges and achievements affecting the Quality of teaching, learning and student experience in their respective Schools. Extracts from the overall comments are outlined below:

School of Biochemistry and Immunology

The School is highly responsive to the constructive advice provided by external examiners in terms of course content, assessment and the student experience. The School has significantly updated its courses over the past number of years, making the School's undergraduate moderatorships among the most popular in Science. The Head of School believes that further validation of success in this regard is seen in the strikingly positive feedback received from supervisors of rising SS students in summer placement. The School has established very valuable links with the University of Massachusetts Medical School and the EMBL Australia node in Single Molecule Science at UNSW Sydney. Each summer, 5-15 B&I students accept placements in laboratories in these world class centres and the feedback is that students are outstanding in terms of their knowledge and training. Many have been offered PhD places as a result. The School maintain that there is no greater external validation of its courses than this.

Furthermore, every year for the past number of years, the SS external examiners have highlighted the outstanding quality of the final year projects which prepares the students very well for postgraduate work but also for careers in industry. This provision and the commitment of the staff comes at a significant cost and labs need to invest their own funds into the projects to allow the students to engage in cutting edge research.

As with the undergraduates, the MSc Immunology and PhD graduates benefit from recently updated course structures and in the case of PhD students the structured component of their training will be significantly improved over the next 2 years.

With regard to Athena Swan, Dr James Murray is taking a lead in the School's application for an Athena Silver award in spring 2018. The School has established a School committee for this and are currently collating data in support of the application.

B&I is under severe space pressure to delivery the current course offerings and with expansion of class sizes in Sophister years, and more recently in the MSc in Immunology, the School is approaching its limit in terms of the sizes of the rooms designated for undergraduate and postgraduate teaching. The point raised by the Immunology external examiner highlighted above is a key factor in this regard:

> *Comment: Of the 19 projects reviewed, only 1 was directly on bacterial infection Recommendation for more bacterial/infectious disease projects.*
> *Action: this increase is dependent on completion of the proposed Cat II facility for cell culture. It is hoped that this project will proceed shortly and be completed in time for next academic year.*

The limited availability of Cat II space in the School and TBSI certainly compromises the School's capacity to run undergraduate projects, MSc projects and PhD work and addressing this deficit would be of great value to the School, TBSI and the College as a whole.

School of Chemistry

The School of Chemistry is committed to the delivery of world class education using modern best practice. The School acknowledges feedback and suggestions made by students, stakeholders and external examiners and acts on these where possible.

The School has invested significant resources from its reserves over the last number of years in enhancing the quality of the undergraduate education provision both with regard to practical classes and tutorial/small-group teaching. Postgraduate student demonstrators have been paid from School reserves to engage with students in laboratory classes and to enable the very successful Broad Curriculum programme that is run in the SF year. The direct input of postgraduate demonstrators in the laboratory sessions results in an enhanced undergraduate student experience and fulfils the School's legal requirement to provide adequate supervision in a lab environment. However, it is not clear whether the School can continue to use its rapidly diminishing reserves in this way.

The ability of the School to significantly increase its undergraduate student numbers and to develop new taught Masters programmes is limited by the available resources. The School will participate in a new M.Sc. in Energy Science, with the School of Physics, with the first cohort enrolling in Sept 2018. Plans are afoot to avail of the opportunities afforded by the TEP to develop a new sub-stream within TR061 Chemical Sciences that will be tailored specifically for the NEU market. The School is also evaluating alternative means of undergraduate module assessment to better align with the changes being brought in by TEP. Examples include the possibility of evaluating supplemental examinations solely by MCQ, and by using viva voce examination for some modules at Sophister level.

External examiner feedback has significantly influenced the strategic direction of the School with respect to diversity issues.

- Several External Examiners raised the issue of gender balance within their numbers, highlighting the image and message that this imbalance can give to the student body. The Athena Swan Action Group within the School has responded positively to this and it is now School policy that at least 2/6 of the External Examiners for the School's Undergraduate degree programmes must be female.

- Gender balance is also taken into consideration when inviting speakers to present at the School's weekly Seminar Programme.

- The School is working actively to attain the Athena Swan Silver Award in 2018. The School hosted a special Athena Swan seminar this semester for staff and postgraduates within the School.

The Sophister Liaison Committee developed within the School is an example of best practice that could be used throughout the College.

The School has encouraged the new Academic Senate developed by the SU, has engaged with the relevant Chemistry participants and will work more closely with the Education Officer of the TCD SU to further enhance the student experience.

School of Computer Science and Statistics

The recently appointed Head of School (July 2017) is focussing on the continuing restructuring process in the School that includes a review of how best to coordinate teaching, curriculum development and quality review. This will better prepare the School for providing quality educational provisions to increasing numbers of students and to take full advantage of the opportunities provided by TEP. The Head of School will provide more detailed comments on this initiative in the next Faculty Quality Report.

School of Engineering

The School will focus on engagement with Athena Swan measures in the coming year, with the aim of applying for accreditation.

The School has strategically identified a new Industry Liaison Administrator position which will further enhance the experience and improve the quality procedures for students on internships.

Engineering has reacted positively to many recommendations from external examiners, including development of new modules and management of project work assessment.

Staffing levels (including internal subject balance) are beginning to be adjusted with the opportunity afforded by E3 expansion. In addition, the development of a sustainable subject quota is being considered.   A project load balancing exercise has been introduced in 2017/18. These measures will contribute to an overall improvement in project supervision quality from the viewpoint of individual students. Space continues to be a problem particularly for students taking project work in Biomedical Engineering.

Full engagement with TEP is ongoing.   The School is an early adopter as part of Phase I and is proactive in flagging general quality issues associated with the initiative to smooth the overall transition.

With increasing student mobility, more definitive grade translation procedures are being developed.   These will be based on general College guidelines but will be modified for individual partner institutions accepting TCD students on engineering programmes.   All students will be apprised of the grade translation process before they leave for study abroad.

School of Genetics and Microbiology

At undergraduate level, the School are aware of three significant pressure points in the provision of final year research projects of high quality.

The first is financial. SS projects cost, on average, €3,000 and the School can offer either nothing or at most €600, so the costs are borne in most cases by the research budgets of individual labs. (G&M funding agencies do not intend that this money be used to support undergraduate education.)

The second pressure point relates to the numbers of SS students relative to the numbers of academic staff available to supervise them. Three projects per member of staff is the maximum that can be managed without undermining quality, yet some in Microbiology are taking four. Students are being sent outside the School to labs in other Schools, to hospitals and to

companies where the quality of the projects and the supervision of the students are beyond the School's day-to-day control. Measures have to be taken to correct for anomalies that arise in offsite projects (typically, over-generous grading of student performance that is out of line with School norms), creating extra work for the School. Offsite projects also involve financial support (€600 per project) for those agreeing to take the students because they are doing us a favour.

The third pressure point concerns those members of staff who no longer have research grants. They require financial support from the School but no assistance can be given with student supervision. In grant-funded labs, the research staff provide day-to-day supervision under the general guidance of the lab head; in labs without grants the staff member does all of the supervision personally in addition to normal teaching and administrative functions, undermining the chances of this person writing successful applications for funding in the future.

The combination of these pressure points create a concern regarding the creation of an academic underclass consisting of colleagues who do not have funding, are deemed by College to be research-inactive, have little chance of recovering and have many years to go before retirement.

At postgraduate level the School is developing a taught masters course in medical genomics and the masters students will conduct a substantial amount of project work. The foregoing narrative concerning SS projects shows that the capacity of the School to absorb even more project students without compromising quality is very limited indeed.

The key risk factors affecting the teaching programmes are: (1) the costly nature of modern experimental work in molecular (micro)biology and genetics and its impact on undergraduate and postgraduate project and practical teaching (2) having academic staff without research grants who may not be able to win new grants in the future – this has a direct impact on teaching through lost financial and supervision power that is not captured in standard assessments of teaching quality (3) having staff recruitment strategies that are linked to the income-generating potential of teaching activities when the research stars that the School is encouraged to recruit regard teaching as a burden that impedes the development of their careers in research. The School does not have the luxury of offering generous teaching holidays to new recruits and this may influence assessments by new staff of the wisdom of accepting academic posts at TCD. This applies in particular to staff with no previous links to Ireland and whose only current link is the job they hold in this College.

In summary, the School does not have enough staff or enough financial resources to be confident of sustaining the high quality teaching programmes of which the School is rightly proud. It is vital that College trusts the School by giving it the maximum room for manoeuvre in managing its teaching programmes against the background of the demands of TEP and the new Science course structure.

School of Natural Sciences

The reports from both Undergraduate and Postgraduate programmes in the School of Natural Sciences are positive, and students get timely feedback. Where necessary the small number of suggestions as to how to improve programmes were implemented in 2017-18.

Currently given the significant state of flux in terms of direct entry streams into Science, the TEP development and the E3 initiative it is important to continue these open networks of communication with the students.

Of major concern is the fact that the School is slow to receive reports from the External Examiners on the three Masters programmes.

School of Physics

Improvements in the quality of the course offerings from the School of Physics is evident from massive increase in demand for places on the School's undergraduate courses. The increase in demand is uniform across all the four courses offered by the School: Physics, Physics and Astrophysics, Nanoscience-PCAM and Theoretical Physics. The School continues joint efforts to make further improvements.

The Head of School has initiated and overseen a number of strategic initiatives aimed at enhancing the international standing of the School and the quality of the programmes. Some of the initiatives are listed below.

- The School Teaching and Learning Committee conducted an extensive review of the JF and SF curricula. Arising from this, amendments were made to changes to JF and SF syllabi to improve the quality of the student experience, including: reducing duplication across modules; reducing knowledge gaps (where the knowledge assumed for the module was not given in the prior modules); increasing the length of the modules for more in-depth material presentation; increasing the elements of continuous assessment. The changes recommended by the Teaching and Learning Committee were implemented in full and lead to the substantial improvement in the quality of the undergraduate teaching.
- A similar review of the PGR teaching resulted in the closure of modules with lower take-up and a refocussing of available resources available to the more essential and more popular offerings.
- The School has conducted an extensive review of the JF, SF and JS teaching laboratories and made significant investments in these, over €100,000 cumulative. This includes the expansion of the JS N-PCAM laboratories initiated in conjunction with the School of Chemistry. The School have acquired and commissioned a number of new experiments and modified the teaching program to realign it with the new equipment installed.
- The School has made significant developments in the Physics and Astrophysics degree, both from the point of attracting new promising academics and improving the teaching and office space for the staff and students, investing over €30,000 in the refurbishment, consolidation and expansion of space for the Physics and Astrophysics students and staff. The School commissioned a large scale radio frequency telescope LOFAR in Ireland, the winner of the SFI National Award in 2017. This facility was developed under the stewardship of the Prof. Peter Gallagher with extensive participation of technical, administrative and support staff, and also undergraduate and postgraduate students. This is the first large telescope built in Ireland in over 150 years. All these actions lead to a massive increase in the popularity of the Physics and Astrophysics degree. The student intake of students in 2017-18 is 25 JF, about three times greater than 10 years ago. The demand from the SF students for the places in the Physics and Astrophysics degree was

close to double of this number.

- − The programme and syllabus for the new MSc in Energy Science, in conjunction with the Schools of Chemistry and Natural Sciences, have been developed.   The first intake is envisaged in September 2018.
- − The Trinity Walton Club continues its successful delivery of physics, mathematics, electronics and computers to secondary school students, led by the School of Physics, in collaboration with the School of Mathematics, and with assistance from the Schools of Engineering and Education. This has the format of weekend classes and also summer and Easter camps. The Walton Club program has been a resounding success and has over 500 students taking part in the programme in the School this academic year. In the summer of 2017 a residential component to the programme was introduced to attract a greater number of non-EU students http://www.tcd.ie/waltonclub/
- − The School was the second physics department in Ireland to be awarded the Institute of Physics 'Juno Practitioner' status and was one of the first three Schools in College to be awarded Athena SWAN Bronze.

2.2 Quality of Undergraduate Programme Provision

The quality assurance procedures in place at undergraduate level resulted in a modular evaluation rate of 97%. Despite noting that procedures were to be put in place to ensure that all modules are evaluated from 2016-17 onwards, this has not yet materialised. Five of the eight Schools achieved the Council-mandated requirements that all UG modules were to be evaluated.

Data gathering and assessment methods remain largely the same as in last year's report. The Faculty noted that response rates are significantly enhanced when paper-based survey are used, though it was generally accepted that this is not feasible in Schools with large numbers of undergraduate modules and restricted resources. A low response rate suggests that survey fatigue may be an issue for some courses.   As per previous years, there remains widespread support towards replacing modular with programme evaluations and recommending a Faculty-wide tool to manage them. This would be in line with the SCSS Qualtrics system of evaluation.

The Faulty has made significant strides towards achieving the College requirement of providing timely feedback on assessments to students, with most Schools now using staff-student liaison committees or email campaigns to great effect. Enhancements in this area will continue in the coming year.

Retention in UG courses in the Faculty is high, and meeting the College's Strategic Plan target of 90%. Where individual course retention falls below that level, it is in small-intake courses where one student retiring from a course can have a significant impact on the retention rate.

Summary of key points:

- 97% of undergraduate modules were evaluated in 2016-17.

- 91% of UG external examiners reports were returned for evaluations that took place during 2016-17.

- Schools across the Faculty employ a diverse range of methods to evaluate their undergraduate programmes, including surveys (online and paper), one-to-one interviews

or group feedback sessions, feedback from class reps and course directors.

- Schools have made significant strides towards closing the feedback loop, including staff-student liaison committees in most Schools.

- The rate of progression of JF to SF (remaining on the same course) 90.2%, against a College Strategic Plan target of 90%.

The School of Biochemistry and Immunology concentrated on conducting a review of teaching at Sophister years to allow integration of the JS course with students emerging from the freshman years of the new biological and biomedical sciences stream (TR060). The intention is to have this review/re-organisation completed and courses in place for the students going into JS in two years' time (i.e. the first cohort of the new TR060 stream). This will not only involve content but also changes in assessment, format, timetabling and delivery.

Within the Schools of Engineering and Computer Science and Statistics, a major achievement during the year was the accreditation of Computer Science and Computer Engineering programmes by Engineers Ireland, the professional body with statutory responsibility for the accreditation of professional engineers in Ireland. Accreditation of the Masters programmes (MCS and MAI) was obtained for the first time. The accreditation is valid for 5 years and represents a major affirmation of the quality of the programmes.

In the School of Computer Science and Statistics, the past year saw the introduction of a new range of modules in Years 4 and 5 of Computer Science and Computer Engineering in response to student demands and External Examiner recommendations.

The coming year will see the School consolidate these arrangements and begin preparations for TEP as soon as the substantive issues relating to course content and structure are resolved.

The School will continue with programme based student surveys during 17-18, and awaits the College's directions on individual module surveys.

In 2017/18, the School of Engineering will introduce new external examiners in (i) Civil, Structural and Environmental Engineering, (ii) Mechanical and Manufacturing Engineering and (iii) Computer Engineering, and such a large changeover represents both a challenge and an opportunity for the School upon which it will endeavour to capitalise.

The incorporation of the principles of TEP is seen as both a challenge and an opportunity. The School is working closely with the Senior Lecturer and the TEP implementation group to ensure that TEP enhances the quality of the programmes which it offers.

The quality of teaching in the School of Genetics and Microbiology is considered to be exceptionally high - the vast majority of students consistently rate their course highly during modular reviews and the external examiners, after interviewing students at the time of the moderatorship exams, provided very positive assessments and did not raise any serious issues about the undergraduate programs.

Module assessment and student feedback: this works very well in Microbiology but there are still deficits in Genetics affecting student response rates. A decision was made at the beginning of 2017/2018 by the School's UG teaching committee to adopt the system Microbiology uses in Genetics with the goal to further improve student feedback. Assistant Professor Joan

Geoghegan has agreed to oversee module assessment and student feedback in the School.

The challenges for the coming year are centred on the incorporation of TEP regulations and integration into the new Science programme structure, most notably the setting up a new, completely revised two-year Human Genetics moderatorship.

The School of Mathematics innovative and highly efficient module evaluations is now up and running, using a computer programme to processes the results and send a summary of the responses to each lecturer. The surveys are conducted before/during Reading Week and the summary is available before lectures resume. This allows ecturers to promptly address any issues. Some of the amendments made last year as a result of the feedback include the introduction of tutorials for one module, the introduction of additional practice problems for another and the introduction of online notes for a third.

The roll out of the new Science programme with brand new entry routes (TR060 and TR062) aligned with the TEP structures is a major challenge but also a major opportunity for the delivery of undergraduate teaching in the School of Natural Sciences. This will be followed in 2019-20 by the implementation of new structures in the joint honours Humanities/Social Science degrees.

The School is also planning for innovations in teaching and learning at the undergraduate level related to the E3 project in collaboration with the Schools of Engineering and Computer Science and Statistics.

All of these developments have presented ongoing opportunities to review the design, delivery, assessment and quality of undergraduate teaching in the School. The implementation of these new structures will also necessitate an ongoing review process as the School learns from experience.

The School of Physics raised concerns that the practical implementation of TEP requires, at least in the short term, a significant increase in teaching and administrative work in the School and called for additional resources to negate any negative effects on the quality of teaching and on students' experiences.

Overall the comments from external examiners were very positive and confirm that the quality of the teaching delivery and of the graduates is very high for all moderatorships in the School of Chemistry. Feedback collected from student evaluations was also positive in general.

A significant proportion of the issues highlighted for improvement were intimately connected with the current set of regulations and the structure of TR071, and so the School is working to integrate the feedback into the design of the new TR061 course starting in 2018-19.

Many of the new TEP-driven regulations approved in May 2017, such as supplemental examinations for all years, will also alleviate concerns expressed in terms of the impact that failed modules have on the final degree award and the various strategies needed for moderating the impact of such marks in a fair manner.

The issue of gender balance and how to integrate it as an embedded criterion for the selection of the external-examination panel was raised to prominence during the year. This is in line with Athena Swan ambitions in the School and College, and the School are leading the way in this area, with a new procedure for selection of external examiners developed to allow for

monitoring of the overall diversity of the panel prior to the nomination process moving forward. The procedure was approved by the School Executive Committee in 2017.

Several examiners highlighted the importance of contact hours for the development of problem-solving skills. With this in mind, financial support for high quality demonstrating time from senior postgraduates was identified as a valuable investment on the part of the institution. The School has internally invested significantly in this area both in terms of postgraduate training and financial remuneration for high quality demonstrating activities. It is unclear whether such provision will be possible in future years given the prospective constraints on the School's budget and in the absence of Faculty/College initiatives for financing tutorial delivery by postgraduates. The School expects a decline in the teaching hours dedicated to problem-solving skills despite the recommendation from external examiners to increase investment in these activities.

2.3 Quality of Postgraduate Programme Provision

Of the 24 Postgraduate Taught (PGT) programmes run in the Faculty in 2015/16, 20 were subject to formal programme student evaluation. The three Schools with non-evaluated programmes will put procedures in place to ensure all programmes are evaluated in the future.

Methods used for evaluations, feedback to students and so on, are broadly similar to those reported for UG courses.

For academic year 2016-17, 76% of PGT External Examiner Reports were returned for FEMS programmes, which is on par with the return rate of the previous two years. The Dean is writing to the non-compliant course directors to ensure that External Examiners reports are returned and actioned.

As a result of the Postgraduate Research survey, several enhancements were noted in FEMS Schools. For details on enhancements/issues/escalations, please see the appendices.

The School of Biochemistry and Immunology are in the process of developing a new 10 ECTS taught module in Biomedical Technologies. This new module will be hosted by the School and will provide an opportunity for PG students to obtain training in key research technologies and research competencies necessary for completing a PhD in the fields of Biochemistry and Immunology. The module was developed in response to feedback from students who have indicated their desire to have taught modules available to them that are more tailored directly to their specific field of study. Once operational, this module could also be taken by other students outside of the School who are pursuing PhDs in the biomedical field. This module will be proposed to graduate students in the 2017/18 academic year and will be rolled out for incoming students in the 2018/19 academic year.

Fifteen students from the School participated in this survey, which represents 3.5% of the postgraduate student body in the School. Overall the results of the study highlighted the following issues which are being addressed directly itself:

- Requirement for improved communication strategies;
- Requirement for strengthening opportunities to achieve a sense of integration into the College, School and Discipline.

Each year the School holds a reception for postgraduate students. Held in late October or early November, it is an important opportunity to welcome the new postgraduate students to the School and highlight the support services that are in place within the School to assist students. In addition it is an opportunity for new incoming students to meet with other PhD students who are further along in their degree. It also provides the students with an opportunity to interact with all of the academic supervisors in an informal setting. This is something which the students greatly appreciate.

In addition, the School awards a prize to a second year PhD student based on their performance at the PhD confirmation process. The School recommends this as a great way to motivate students to submit their confirmation.

The postgraduate taught programmes in the School of Engineering have continually evolved. With the new E3 developments, thoughts have been given to integrating programmes across the anchor Schools. This would involve students taking some shared modules, for example Research Methods. This would also allow students from different Schools to integrate on shared assignments.

Increasing numbers on the MSc programs has been limited by supervisory capacity (with the increasing numbers in the 5th year of the MAI program, the supervisor load has increased for all staff). There is also a challenge of physical access to laboratories for experiments. These concerns have been discussed at the College's Postgraduate Committee and are echoed by colleagues in other Schools.

The feedback in Genetics and Microbiology from external PhD thesis examiners is almost universally highly positive and this is reflected in the generally very high levels of satisfaction (>80% 'highly satisfied' or 'satisfied') that FEMS graduate students have reported in the 2015-2016 Postgraduate Research Survey Report conducted by College.

The School's academic staff are working very hard, in a highly challenging research funding climate, to bring in external funding to provide stipends and pay considerable postgraduate fees for the students. Again, this is reflected in the fact that FEMS students report the highest stipends for postgraduate students in College (2015-2016 Postgraduate Research Survey).

In the context of the above, the disparity in the funding for PG student fees provided by external funding agencies (e.g. SFI, €5K per annum) versus the fees levied by College (€6.2K per annum) is putting academic staff and School budgets under increasing pressure.

The progressive increase in UG student numbers, coupled with the requirement by College to provide a 'capstone' final year research project that is not funded, is placing increased strain on laboratory budgets and PG student time. PG students are not compensated for the time they spend supervising increasing numbers of final year UG research projects.

PG supervisors in the School typically spend a great deal of time on PG student supervision and most make themselves available to their students on an almost daily basis. This level of commitment is highly commendable and is very much at the upper end of the 'availability to consult with PhD supervisor' scale as reported in the 2015-2016 Postgraduate Research Survey Report. Therefore, the School is satisfied that very high standards of PG student supervision are being provided within the School.

The high standards of PG student supervision is also reflect in the fact that the School published

many papers in international journals of very high calibre and impact during the past 3 years and beyond.

The School of Natural Sciences raised a concern regarding the submission of External Examiners reports, noting that the report for the MSc in Environmental Science was not received.

Postgraduate administrative matters in the School of Chemistry have been addressed at times in a partially *ad hoc* manner. The School Administrative Manager, the DPTL and the appropriate office administrative staff have recently agreed a formal year calendar that will facilitate the smooth running of administrative matters associated with the PG programme.

The DubChem structured PhD programme requires that students obtain 30 credits from approved DubChem modules before submission of a PhD thesis. At present students are not credited (by DubChem) for non-DubChem courses that they take in College, such as the modules in Entrepreneurship or Statistics. PGs directly requested that some recognition be afforded for non-DubChem courses, a view also supported by the School reviewers. A recent meeting of the DubChem committee (October 2017), attended by both Heads of School and PG representatives, agreed to this in principle and this policy will come into effect if approved by Executive Committees in both Schools. This flexibility has the benefit of also addressing the difficulty in offering as broad a range of courses as possible.

In response to PG reps requests, both Schools (UCD and TCD) have agreed to explore the possibility of certifying the teaching experience of PGs in light of their TA/demonstrating history.

DubChem module records are held in the UCD Gradebook system with Trinity students administered (by special arrangement) by TCD. DubChem have agreed to reinstate meetings to review student progress towards attaining the credits required at both the mid-term (PGs are required to have passed 15-ECTS of modules by the time of their transfer viva) and end of their studies (PGs must have passed 30 ECTS of modules before submitting a Ph.D. thesis for examination). This scrutiny will be an early identifier of potential problems. In a bid to ensure best practice and continuing programme quality, Prof. Paul Evans of UCD has been charged with consulting with the WestChem group, a similar interinstitutional programme involving the universities of Glasgow and Strathclyde.

The DubChem Committee had not met as frequently as might have been ideal, but have now agreed to an increased frequency of meetings to monitor PG student progress, to review module variety and quality, to ensure the administration of the programme runs smoothly, and to explore the possibility of DubChem cooperating with other third-level institutions. An annual conference for third-year PG students from both UCD and TCD to present their research has been established, and in the last couple of years, a small number of DIT students have also participated in this event.

2.4 Update on issues outlined in previous years Annual Faculty Quality Report

Last year, several Schools felt that individually evaluating every module may not be the most appropriate way to gather data on the student experience, especially at UG level. The Faculty was to explore the possibility of replacing modular evaluation with programme evaluation in certain circumstances, with the dual aim of enabling an assessment of overall student experience and reducing the incidence of survey fatigue among students.

- Update: The School of SCSS, who conduct a programme review of the UG programmes, are awaiting feedback from Council on the appropriateness of modular v programme level evaluation.

In 2016-17, Schools in the Faculty will place emphasis on enhancing the feedback loop mechanisms to the both student body and to external examiners. This will include an evaluation of the methods and success of the School Executive Committees, DUTLs and DPTLs, Student Liaison Committees, and Curriculum Development Committees.

- Update: All Schools across the Faculty have enhanced their feedback mechanisms, with enhancements including the introduction/better use of staff-student liaison committees, pilot projects on mid-term evaluations and email campaigns. A further update will be provided next year, when these enhancements have embedded in, and it is to be hoped that issues around timely feedback should not feature as heavily in student and external examiner reviews.

The Faculty continues to seek to fill the vacant established Chair positions across the eight Schools.

- Update: non-Thapar Chairs are to be advertised simultaneously under the forthcoming E3 recruitment launch/campaign (date to be confirmed – linked to E3 branding).
    - Computer Science & Statistics
        - o Prof of Intelligent Systems
        - o Prof of Statistics
        - o B.M. Thapar Prof of Computer Science (2017) – at advertising
    - Engineering
        - o Prof of Electronic Engineering (1980)
        - o Prof of Mechanical Engineering (1998)
        - o L.M. Thapar Prof of Engineering (2017) – offer made
    - Natural Sciences
        - o Prof of Geography

2.5 Faculty Projects / Initiatives

Please see the Executive Summary for details of the major Faculty-wide projects and initiatives that will continue in the coming years.

2.6 Summary of issues to be escalated to College Level

All issues within their remit raised were dealt with at School level.

The main Faculty-wide issues for escalation are:

- As per previous years, by far the most common issue raised by students in a number of Schools is the sub-optimal quality of many of the teaching and learning spaces used by Schools within the Faculty. This includes particularly the Goldsmith Hall, which is unsuitable for lectures. Where possible Schools try to accommodate classes in appropriate spaces, but some classrooms are simply too small for increasingly large class sizes. Of particular concern is the lack of growth space for Schools, especially when trying to recruit senior, world-ranked academics.

- The Faculty would be in favour of amending the current timeframe for the collation and presentation of the Faculty Quality Report to the Quality Committee. For an optimal report, the background surveys and reviews should all correspond to the same academic year. This would allow School responses to be consistent across years and therefore comparable for cross-referencing. This is particularly noticeable in the case for the ISSE report (this report is based on the 2015-16 ISSE, as by the time the 2016-17 ISSE received approval from the Quality Committee FEMS Schools had already complete their response templates. Information from 24 months ago is out of date). FEMS would ask that the Quality Committee re-evaluate the timings of both the background and the Faculty reports.

- The Faculty would like to see a coherent approach to student recruitment and marketing, relevant across all cohorts (Irish, EU and NEU), that would reduce duplication of effort, eliminate non-consistent reporting of student numbers and increase cross-selling of offerings.

- The coordination of the undergraduate science websites remains an issue, and may be considered a barrier to the recruitment of NEU students in particular. This is a key issue to be resolved in the coming year and will necessitate input from outside the Faculty.

- The issue of student diversity has the potential to become a significant challenge for FEMS Schools. The Faculty would welcome College-wide initiatives to track diversity at the application stage, and proactive initiatives to expand recruitment into under-represented countries.

3. APPENDICES - FACULTY AT A GLANCE

3.1 FEMS UG Module Evaluations

Across the Faculty, the quality assurance procedures in place at undergraduate level resulted in a modular evaluation rate of 97%.

School	Undergraduate			
	No.	Evaluated	Modular feedback provided	Response rate
School of Biochemistry and Immunology	58	47	Overall feedback provided to students	70%
School of Chemistry	41	41	All, via class reps	100%
School of Computer Science and Statistics	107	107	N/A	18-28% (Note: programme evaluation)
School of Engineering	169	169	All, via student liaison committees	Good
School of Genetics & Microbiology	32	32	All, via JS and SS co-ordinators	Vary, averaging approx. 88%
School of Mathematics	57	57	As required	42-81%
School of Natural Sciences	84	81	All, via email	Close to 100%
School of Physics	48	48*	All, via staff-student liaison committees	Over 60% (*3 practical modules via interview)
Total	**596**	**582**	**N/A**	**Variable**

3.2 Summary of Course Evaluations

Of the 24 Postgraduate Taught (PGT) programmes run in the Faculty in 2015/16, 20 were subject to formal programme student evaluation.

School	PGT			
	No.	Evaluated	Prog. feedback provided	Response rate
School of Biochemistry and Immunology	1	1	1	High
School of Computer Science and Statistics	8	7	4	Good
School of Engineering	11	9	Via student reps	Variable
School of Mathematics	1	0	N/A	N/A
School of Natural Sciences	3	3	All, via email	High

School	PGT			
	No.	Evaluated	Prog. feedback provided	Response rate
School of Chemistry	N/A	N/A	N/A	N/A
School of Genetics & Microbiology	N/A	N/A	N/A	N/A
School of Physics	N/A	N/A	N/A	N/A
Total	**24**	**20**	**N/A**	**Moderate**

3.3 Summary of return of External Examiner Evaluations

For academic year 2016-17, 91% of UG and 76% of PGT External Examiner Reports were returned for FEMS programmes, which is on par with the return rate of the previous two years.

The Dean has written to the non-compliant course directors to ensure that External Examiners reports returned and actioned.

Cohort	No. of Reports	No. returned	% returned
Undergraduate	34	31	91%
Postgraduate Taught	25	19	76%

School	Undergraduate			Postgraduate Taught		
	No. of Reports	No. returned	% returned	No. of Reports	No. returned	% returned
School of Biochemistry and Immunology	4	4	100%	1	0	0%
School of Chemistry	6	6	100%	N/A	N/A	N/A
School of Computer Science and Statistics	4	3	75%	9	7	78%
School of Engineering	6	5	83%	11	9	82%
School of Genetics & Microbiology	3	3	100%	N/A	N/A	N/A
School of Mathematics	2	1	50%	1	0	0%
School of Natural Sciences	8	8	100%	3	3	100%
School of Physics	1	1	100%	N/A	N/A	N/A

3.4 Summary of enhancements, best practise and repeat issues 2016-17.

Selected School enhancements in 2016-17:

- SCSS UG courses: A new range of optional modules has been introduced. The main work of the past year has been introducing a new range of modules in Years 4 and 5 of Computer Science and Computer Engineering. Student feedback was taken into account in devising and selecting modules. This year, the School intends to consolidate these arrangements and begin preparations for TEP as soon as the substantive issues relating to course content and structure are resolved. This process will continue. Extract from the survey responses:
  1. Students think that coursework is extremely effective for helping them to learn course material.
  2. There is a broad range of interesting modules to choose from.
  3. The programmes have good and approachable lecturers.
- SCSS: The student assessment of one module at PGT level highlighted significant difficulties and was subsequently revised.
- SCSS: the External Examiner felt that PGT students were too busy, so the new MSc in Computer Science has been designed to reduce timetabled hours. The Course Director will also monitor the burden of coursework on the new programme.
- As a result of the PGR survey last year, G&M have:
  - Begun planning for introduction of a PhD student orientation day in the first term.
  - Introduced a monthly gathering of postgraduate students and post-docs to increase opportunities for integration within the local community, enhance collaboration, and improve the student experience.
  - Provision of more concrete information to students regarding PhD confirmation report deadlines, ECTS taught modules available, and PhD submission process.
- Maths: selected UG modules have seen the introduction of problem solving sessions, additional tutorials and additional practice problems, in response to student feedback for same.
- Maths: module evaluations are now run using a computer program that processes the results and sends a summary of the responses to each lecturer. The surveys are conducted before/during Reading Week and the summary is available before lectures resume. This allows the lecturers to promptly address any issues.
- Physics: the introduction of a single system for projects for Theoretical Physics students, jointly between the Schools of Physics and Maths.
- As a result of the PGR survey last year, Physics have:
  - Expanded the handbook for postgraduate students providing more detailed information on students' duties and rights. Particular attention is given to the Confirmation Examination happening at the end of 18 months of their studies.
  - Induction sessions that are normally offered to first-year students are open to all postgrads. These sessions are very informative and give the students the opportunity to liaise with their peers as well as with the Postgraduate Student Support Officer.
  - Regarding the development of transferable skills, the postgraduate seminar programme in the School has been reintroduced recently and is the ideal opportunity for students to improve their communication skills in a friendly environment. PhD students give short presentations about their research to their peers and have the opportunity to socialise afterwards over a slice of pizza provided by the School.
  - Strong effort has been made to convince supervisors and students alike that it is in their best interest to fill in the annual progress report. When problems are flagged early on, they can often be resolved before it is too late and the reports are the ideal form for that.

- Reduction in the number of taught modules offered to PG students due to low demand. As a result, students are now given the chance of taking modules from elsewhere, subject to approval by the DPTL.
- Enhancements in the UG Engineering courses included:
  - The introduction of viva voce examinations for MAI projects.
  - Increased opportunities for external examiners to meet with students during their visit to TCD.
  - Enhanced clarity of marking schemes and of enumeration of marks on scripts enhancing the transparency of marking processes.
- Enhancements at PGT level in Engineering included:
  - Diplomas: Several students in full-time employment found it difficult to come to Trinity during office hours to register. The Graduate School of Professional Engineering Studies (GSPES) initiated a procedure with the Academic Registry whereby students could send in their photo ID to the GSPES office, who would then arrange with the Academic Registry for the cards to be issued.
  - For the MSc in Engineering (by Module): In 2015, students complained about the workload: this was addressed by introducing a new 15-credit module in Research Methods and thus reducing the number of other taught modules. According to the 2016/17 students this new approach worked very well.
- Overall the External Examiners reports in the School of Chemistry were very positive and confirmed that the programmes in the School deliver high quality graduates and that the assessment structure accurately identifies and differentiates academic performance in the student cohorts. Some examiners' comments follow that have led to improvements and actions internal to the School.
  - Gender balance: Following the feedback from External Examiners the School will consider gender balance in the external examiners' panel as a criterion in future selection of external examiners. The School has internally agreed to at least achieve a 3/6 female representation in the panel; gender balance was indeed included as a criterion in the last process of nomination of external examiners (June/July).
  - Similarly, wherever possible, gender balance will be sought in the cohort of students chosen by the examiners to provide feedback on the student experience in the moderatorships managed by the School.
  - Finally, the breakdown of examiners whose home institutions are in the UK vs. other EU universities will also be considered, wherever possible, during the nomination process with the objective of achieving a sufficiently diverse external examiners' panel.
  - Module descriptors: the School will provide a set of module descriptors together with the examiners' package in future years so that the papers can be put in the context of the corresponding syllabi.
  - Student ranking analysis: Student lists will be presented to examiners ranked by order of final moderatorship mark as well as by order of SS year examination mark. The two rankings will also be used for discussion at the Sophister internal examiners' meeting following recommendations.

Best practise 2016-17:

- MSISS external examiner: There were some excellent student performances and once again, some really outstanding Final Year Projects. Several of these were really impressive and of a considerably higher standard than many masters dissertations, both in my own university and in other universities where I have been an external examiner.
- Engineering external examiner: The laboratory exercises that the students are exposed to and the internships appear to offer excellent exposure to real world problems for the students.

- Computer Science external examiner: The 4th year Internship programme is a great activity. It was also good for the students to undertake the associated activities (goals, diary, reflection document, poster, presentation, report) that help them step back from the day-to-day immersion in their internship.
- Engineering: Continuous feedback is provided to the students at the Freshman and Sophister Student Liaison Committee meetings and via email communications.
- Engineering: Having discussed the external examiner reports at the School of Engineering Curriculum Committee, a formal procedure for response to the all of the reports received from the external examiners is being coordinated by the Director of Teaching and Learning (Undergraduate) at School level and will be communicated to each of the external examiners individually.

Repeat issues and escalations:

- The Faculty did not meet the Council criteria of evaluating all UG and PGT modules in 2015-16. The relevant Schools have a plan in place to ensure this is resolved by next year.
- SCSS - Lack of catering facilities for PGT students - this issue has been raised many times over the years to no effect.
    - Issue: open.
- G&M: students requested that the bioinformatics component of that module should take place in a computer lab to allow practical work.
    - Issue: resolved. Computer labs now used for this component.
- G&M: Lecture notes and reading material not appearing on Blackboard several days after lecture takes place.
    - Issue: resolved. Reminder sent to all staff to make reading materials available on Blackboard within a reasonable time of lecture taking place.
- G&M: The external examiner for the Microbiology degree remarked that "the range of organisms that the department's expertise covers in detail is somewhat limited by the small number of staff and this is likely to impact on the range of microbiological expertise Ireland is able to call upon in the future. This is particularly the case with respect to virology and parasitology, and emerging microbiological diseases."
    - Issue: Escalated. To be discussed with the Dean during staff planning.
- G&M: Some students have expressed frustration about the time taken from submission of PhD applications via SITS and final letters of offer being issued.
    - Issue: To be raised at AR Forum.
- G&M: Some students have commented on the delay between submission of PhD theses and external examiner nomination forms being sent to DPTL postgraduate and PhD supervisors.
    - Issue: open.
- Physics: TP students requested the option of a single compulsory project, to replace a compulsory project in Physics and an optional project in Maths.
    - Issue: resolved. This was resolved through the TP committee, with the introduction of a single project in 2017/18.
- Physics: the External examiner again made comments on the Low marks on the 'problem solving paper'.
    - Issue: resolved. The School is reviewing the arrangements for the problem solving paper and will adapt the question style in light of the external examiner's feedback.

- Engineering: Module enrolment issues were again raised at the start of the academic year for those students who had been required to sit supplemental examinations, and lack of dedicated computer laboratory facilities and access.
    - Issue: ongoing. Module enrolment date needs to be brought back to the end of the first week of term rather than the end of the third week for students in the School of Engineering as the current deadline means that much of the material has already been missed by students changing modules. This is especially problematic for visiting students as they have a later date than local students for confirmation of their module choices.
- Engineering: As previously reported, access needs to be provided to computer laboratories in other Schools to Freshman students in the School of Engineering as there are no dedicated Engineering computer laboratory facilities.
    - Issue: ongoing. This situation was somewhat improved this year by the introduction of the recently refurbished CADLAB in Aras an Phiarsaigh however, the provision of dedicated Freshman computer laboratories remains an issue for the School.
- Engineering (by Module) (MSc): An external examiner was never formally appointed for this course, though the course coordinator can confirm that the informal external examiner was very happy with the standard.
    - Issue: resolved. This MSc offering has been rigorously updated to maximise student recruitment, and the revamped proposal will be presented to Council for approval before the year end. The School will ensure that an external examiner is formally appointed to this MSc programme.

3.5 Accreditation Cycle

Accreditation body	Name of Programme accredited	UG/PG	Last Accreditation Visit	Outcome achieved	Next Visit Due
Engineers Ireland	BAI in Biomedical Engineering	UG	December, 2016	Accredited for 5 years	December, 2021
	BAI in Civil, Structural and Environmental Engineering	UG	December, 2016	Accredited for 5 years	December, 2021
	BAI in Computer Engineering	UG	December, 2016	Accredited for 5 years	December, 2021
	BAI in Electronic Engineering	UG	December, 2016	Accredited for 5 years	December, 2021
	BAI in Electronic and Computer Engineering (combined programme)	UG	December, 2016	Accredited for 5 years	December, 2021
	BAI in Mechanical and Manufacturing Engineering (Previously titled BAI in Mechanical Engineering)	UG	December, 2016	Accredited for 5 years	December, 2021
	BSc (Ing) in Engineering with Management	PG	December, 2016	Accredited for 5 years	December, 2021
	MSc in Engineering (Civil)	PG	December, 2016	Accredited for 5 years	December, 2021
Institute of Physics	B.A. Moderatorship x 4 (Physics, Physics and Astrophysics, Theoretical Physics, Nanoscience.)	UG	2011	Accredited	Spring 2018

School of Engineering:

- The Accreditation Panel recommended that the School appoint an Internship Officer who would oversee all aspects of the School's internship programmes and act as the liaison person with industry. This position has now been included in the E3 Business Plan and the School will make such an appointment in September, 2018.

School of Physics

- Accreditation was due for renewal in March 2017, but the School was granted an extension and will go through the process in 2018. The extension is to allow for revisions to the course structure under the Trinity Education Project that will come in during the next accreditation period. The School is currently planning these revisions, guided by the previous accreditation report and the professional accreditation requirements.

Note:

- Programmes in the School of Chemistry (Chemistry TR071, Medicinal Chemistry & Chemistry with Molecular Modelling) are not currently accredited by the Royal Society of Chemistry Ireland, as they fail to meet RSC requirements for practical lab hours.

3.6   Quality Review Cycle

Quality Reviews in Academic Year	Type	Current Status
Quality Reviews conducted this Academic Year	Nil	
Quality Reviews due next Academic Year	Nil	

*School (S); Programme (P); Research (R).

3.7 Progression, Retention and Completion Statistics

Retention in UG courses in the Faculty is high, and meeting the College's Strategic Plan target of 90%.

Faculty Total UG JF New Entrants	817	
Progressed same course	736	90%
Repeat same course	22	3%
Transferred other course	24	3%
Was not retained	35	4%

Table: UG New Entrants retention data for FEMS (draft, as submitted for inclusion in the Senior Lecturer's report 2017/18)

School	Course	Totals		Attendance		Gender		Mature	Fee status		Access				
		Total	Total %	Full-Time	Part-Time	F	M	Y	EU	NEU	DARE (Merit)	DARE (pts)	HEAR (Merit)	HEAR (pts)	Total
Chemistry	**Medicinal Chemistry**	**24**	--	**24**	**0**	**17**	**7**	**0**	**24**	**0**	**0**	**2**	**0**	**2**	**4**
	Progressed same course	20	83%	20	0	14	6	0	20	0	0	1	0	2	3
	Repeat same course	1	4%	1	0	0	1	0	1	0	0	0	0	0	0
	Transferred other course	1	4%	1	0	1	0	0	1	0	0	1	0	0	1
	Was not retained	2	8%	2	0	2	0	0	2	0	0	0	0	0	0
Computer Science and Statistics	**Computer Science**	**90**	--	**90**	**0**	**17**	**73**	**1**	**86**	**4**	**2**	**3**	**4**	**1**	**10**
	Progressed same course	87	97%	87	0	17	70	1	83	4	2	3	4	1	10
	Repeat same course	2	2%	2	0	0	2	0	2	0	0	0	0	0	0
	Transferred other course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Was not retained	1	1%	1	0	0	1	0	1	0	0	0	0	0	0
	MSISS	**24**	--	**24**	**0**	**11**	**13**	**0**	**23**	**1**	**0**	**2**	**0**	**2**	**4**
	Progressed same course	24	100%	24	0	11	13	0	23	1	0	2	0	2	4
	Repeat same course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Transferred other course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Was not retained	0	0%	0	0	0	0	0	0	0	0	0	0	0	0

School	Course	Totals		Attendance		Gender		Mature	Fee status		Access				
		Total	Total %	Full-Time	Part-Time	F	M	Y	EU	NEU	DARE (Merit)	DARE (pts)	HEAR (Merit)	HEAR (pts)	Total
Engineering	**Engineering**	**161**	**--**	**161**	**0**	**45**	**116**	**4**	**159**	**2**	**3**	**4**	**4**	**8**	**19**
	Progressed same course	156	97%	156	0	42	114	4	154	2	3	3	4	7	17
	Repeat same course	3	2%	3	0	3	0	0	3	0	0	1	0	1	2
	Transferred other course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Was not retained	2	1%	2	0	0	2	0	2	0	0	0	0	0	0
	Eng with Management	**19**	**--**	**19**	**0**	**7**	**12**	**0**	**19**	**0**	**0**	**0**	**0**	**1**	**1**
	Progressed same course	16	84%	16	0	5	11	0	16	0	0	0	0	1	1
	Repeat same course	3	16%	3	0	2	1	0	3	0	0	0	0	0	0
	Transferred other course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Was not retained	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
Genetics and Microbiology	**Human Genetics**	**16**	**--**	**16**	**0**	**10**	**6**	**0**	**15**	**1**	**1**	**2**	**2**	**1**	**6**
	Progressed same course	16	100%	16	0	10	6	0	15	1	1	2	2	1	6
	Repeat same course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Transferred other course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Was not retained	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
Mathematics	**Mathematics**	**25**	**--**	**25**	**0**	**3**	**22**	**1**	**25**	**0**	**1**	**0**	**1**	**0**	**2**
	Progressed same course	21	84%	21	0	3	18	1	21	0	1	0	1	0	2
	Repeat same course	2	8%	2	0	0	2	0	2	0	0	0	0	0	0
	Transferred other course	1	4%	1	0	0	1	0	1	0	0	0	0	0	0
	Was not retained	1	4%	1	0	0	1	0	1	0	0	0	0	0	0
Natural Sciences	**Earth Sciences**	**16**	**--**	**16**	**0**	**8**	**8**	**1**	**16**	**0**	**0**	**0**	**0**	**0**	**0**
	Progressed same course	15	94%	15	0	7	8	1	15	0	0	0	0	0	0
	Repeat same course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Transferred other course	1	6%	1	0	1	0	0	1	0	0	0	0	0	0
	Was not retained	0	0%	0	0	0	0	0	0	0	0	0	0	0	0

School	Course	Totals		Attendance		Gender		Mature	Fee status		Access				
		Total	Total %	Full-Time	Part-Time	F	M	Y	EU	NEU	DARE (Merit)	DARE (pts)	HEAR (Merit)	HEAR (pts)	Total
Physics	**Theoretical Physics**	**36**	**--**	**36**	**0**	**6**	**30**	**0**	**35**	**1**	**3**	**1**	**0**	**1**	**5**
	Progressed same course	27	75%	27	0	5	22	0	27	0	2	1	0	1	4
	Repeat same course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Transferred other course	8	22%	8	0	1	7	0	8	0	1	0	0	0	1
	Was not retained	1	3%	1	0	0	1	0	0	1	0	0	0	0	0
Multi-School	**Chemistry with Mol Mod**	**4**	**--**	**4**	**0**	**2**	**2**	**0**	**4**	**0**	**0**	**0**	**0**	**0**	**0**
	Progressed same course	2	50%	2	0	1	1	0	2	0	0	0	0	0	0
	Repeat same course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Transferred other course	2	50%	2	0	1	1	0	2	0	0	0	0	0	0
	Was not retained	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	NPCAM	**23**	**--**	**23**	**0**	**5**	**18**	**1**	**23**	**0**	**0**	**2**	**0**	**1**	**3**
	Progressed same course	20	87%	20	0	4	16	1	20	0	0	2	0	1	3
	Repeat same course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Transferred other course	1	4%	1	0	0	1	0	1	0	0	0	0	0	0
	Was not retained	2	9%	2	0	1	1	0	2	0	0	0	0	0	0
	Science	**320**	**--**	**320**	**0**	**183**	**137**	**14**	**310**	**10**	**6**	**14**	**5**	**29**	**54**
	Progressed same course	280	88%	280	0	159	121	12	273	7	4	10	5	22	41
	Repeat same course	11	3.4%	11	0	5	6	0	10	1	1	3	0	3	7
	Transferred other course	8	2.5%	8	0	6	2	0	8	0	0	0	0	1	1
	Was not retained	21	7%	21	0	13	8	2	19	2	1	1	0	3	5

School	Course	Totals		Attendance		Gender		Mature	Fee status		Access				
		Total	Total %	Full-Time	Part-Time	F	M	Y	EU	NEU	DARE (Merit)	DARE (pts)	HEAR (Merit)	HEAR (pts)	Total
Multi-Faculty	**Comp Sci and Business**	**23**	**--**	**23**	**0**	**6**	**17**	**0**	**22**	**1**	**0**	**2**	**0**	**1**	**3**
	Progressed same course	23	100%	23	0	6	17	0	22	1	0	2	0	1	3
	Repeat same course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Transferred other course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Was not retained	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Comp Sci and Language	**20**	**--**	**20**	**0**	**9**	**11**	**0**	**20**	**0**	**0**	**0**	**2**	**0**	**2**
	Progressed same course	15	75%	15	0	8	7	0	15	0	0	0	1	0	1
	Repeat same course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Transferred other course	2	10%	2	0	1	1	0	2	0	0	0	1	0	1
	Was not retained	3	15%	3	0	0	3	0	3	0	0	0	0	0	0
	Political Sci and Geography	**16**	**--**	**16**	**0**	**13**	**3**	**0**	**15**	**1**	**0**	**2**	**0**	**0**	**2**
	Progressed same course	14	88%	14	0	11	3	0	14	0	0	2	0	0	2
	Repeat same course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Transferred other course	0	0%	0	0	0	0	0	0	0	0	0	0	0	0
	Was not retained	2	13%	2	0	2	0	0	1	1	0	0	0	0	0
Grand Total	--	817	--	817	0	342	475	22	796	21	16	34	18	47	115

3.8 Irish Survey of Student Engagement summary

The Irish Survey of Student Engagement (ISSE) measures student engagement with higher education, beyond that ascertained through student satisfaction surveys. A summary of the ISSE findings, as they pertain to FEMS in AY16-17, is outlined below:

Key findings (College level):
- A total of 2,047 students across College responded to the 2016/17 survey. This produced an overall response rate of 24.6%, slightly up on last year.
- Trinity's scores are higher than the overall score of the other six ISSE Irish Universities in three of the nine indices: Higher Order Learning, Reflective and Integrative Learning, and Quantitative Reasoning.
- At a sectoral level Higher Order Learning (critical thinking and problem solving) continues to be highest scored index for Trinity and across ISSE Universities.
- The Student-Faculty Interaction index has been the lowest scoring index in ISSE since the initiation of the national survey in 2012/13 at sectoral level for Trinity and across the other ISSE Universities.
- Scores under the Student Faculty Interaction index point to the continuing need to focus on the first year experience.
- Over 70% of respondents reported that they 'quite a bit' or 'very much' apply Higher Order Learning skills. FEMS respondents reported lower scores compared to AHSS respondents. FEMS respondents apply facts, theories or methods to practical problems or new situations.
- Connecting ideas from academic learning to prior experiences and knowledge received the strongest response in this area (AHSS 74%; FEMS 60%; HS 76%).
- 52% of the respondents in AHSS and 54% in HS reported they actively applied study strategies in their learning, compared to 42% in FEMS respondents, however increases were seen across all cohorts in FEMS compared to 2015/16 (2016/17 58%; 2015/16: 42%).
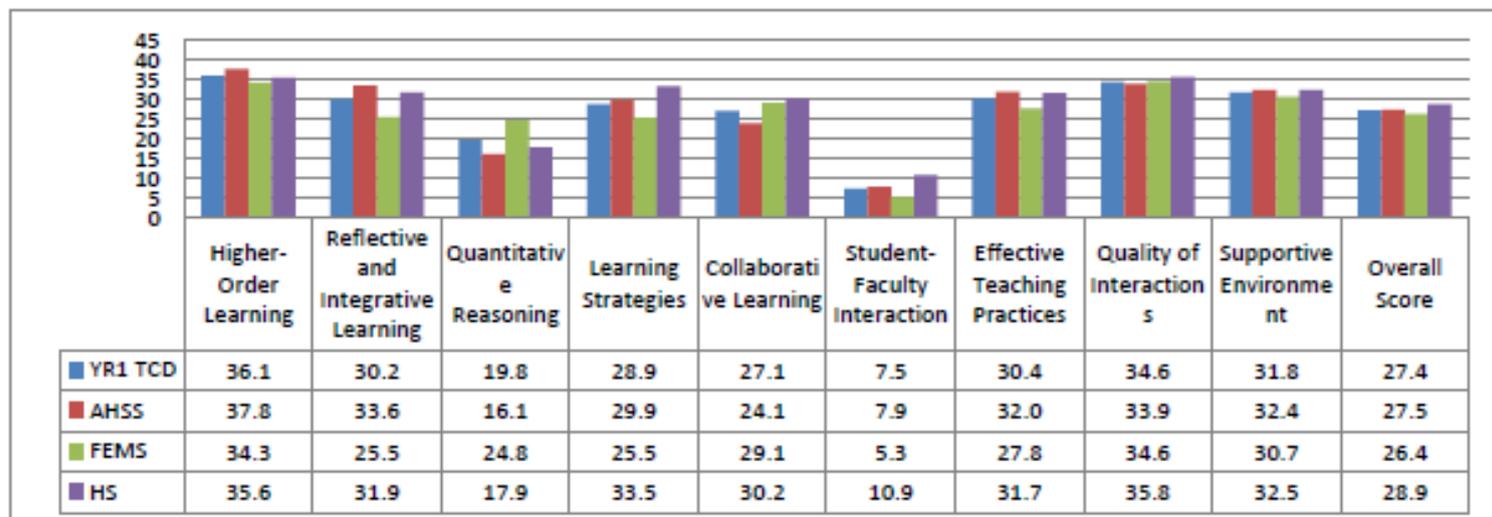
Key findings (FEMS):
- Representation by the Faculty of Engineering, Mathematics & Science (FEMS) respondents also increased by 16% compared to 2015/16.
- Generally, at undergraduate level, the indices reported are good (i.e. >50%) with the exception of (iii) quantitative reasoning and (vi) student faculty interaction. FEMS respondents reported 'very little' experience in evaluating a point of view, decision or information source compared to the other faculties - this was disputed by the Directors at the Special Faculty meeting on quality held in December 2017. The attendees felt the questions may have been misunderstood by the respondents.
- The issue of low scoring 'quantitative reasoning' is of concern, but again was disputed at the Special Quality meeting, with the Director's feeling that this is not reflective of the undergraduate programmes in FEMS.
- FEMS respondents use Quantitative Reasoning skills more frequently than other faculties (AHSS 24%; FEMS 41%; HS 26%).
- FEMS reported more frequent use of reaching conclusions based on their analysis of numerical information (AHSS 26%; FEMS 58%; HS 30%) and evaluating what others have concluded from numerical information (AHSS 19%; FEMS 32% HS 23%).
- Respondents in the final year of study in FEMS reported increased opportunities to use reflective and integrated learning skills (2016/17: 49%; 2015/16: 42%). An increase is evident in combining ideas from different modules when completing assignments (2016/17: 66%; 2015/16: 55%) and examining strengths and weaknesses of their own views on topics and

issues (2016/17 45%; 2015/16: 37%).

- In 2016/17, across the first year of study in FEMS, 48% of respondents reported they frequently approach another student to help understand course material compared to 58% in 2015/16, a fall of 10%. The proportion of final year respondents who frequently explain course material to one or more students fell by 14% (2016/17: 37%; 2015/16: 50%).

Extract from the ISSE report illustrates the FEMS scores in each ISSE category, compared to the other two faculties. FEMS is below the College average in five categories.

Figure 3: Faculty scores across YR1

	Higher-Order Learning	Reflective and Integrative Learning	Quantitative Reasoning	Learning Strategies	Collaborative Learning	Student-Faculty Interaction	Effective Teaching Practices	Quality of Interactions	Supportive Environment	Overall Score
YR1 TCD	36.1	30.2	19.8	28.9	27.1	7.5	30.4	34.6	31.8	27.4
AHSS	37.8	33.6	16.1	29.9	24.1	7.9	32.0	33.9	32.4	27.5
FEMS	34.3	25.5	24.8	25.5	29.1	5.3	27.8	34.6	30.7	26.4
HS	35.6	31.9	17.9	33.5	30.2	10.9	31.7	35.8	32.5	28.9

3.9 PGR survey 2016-17

The Postgraduate Research (PGR) survey was introduced as an enhancement initiative arising from the Annual Faculty Quality Report 2013-14. The survey questionnaire in 2016-17 comprised a maximum 23 questions, addressing the following key areas of interest:
  I. Experience of the postgraduate research programme;
  II. Professional and skills development;
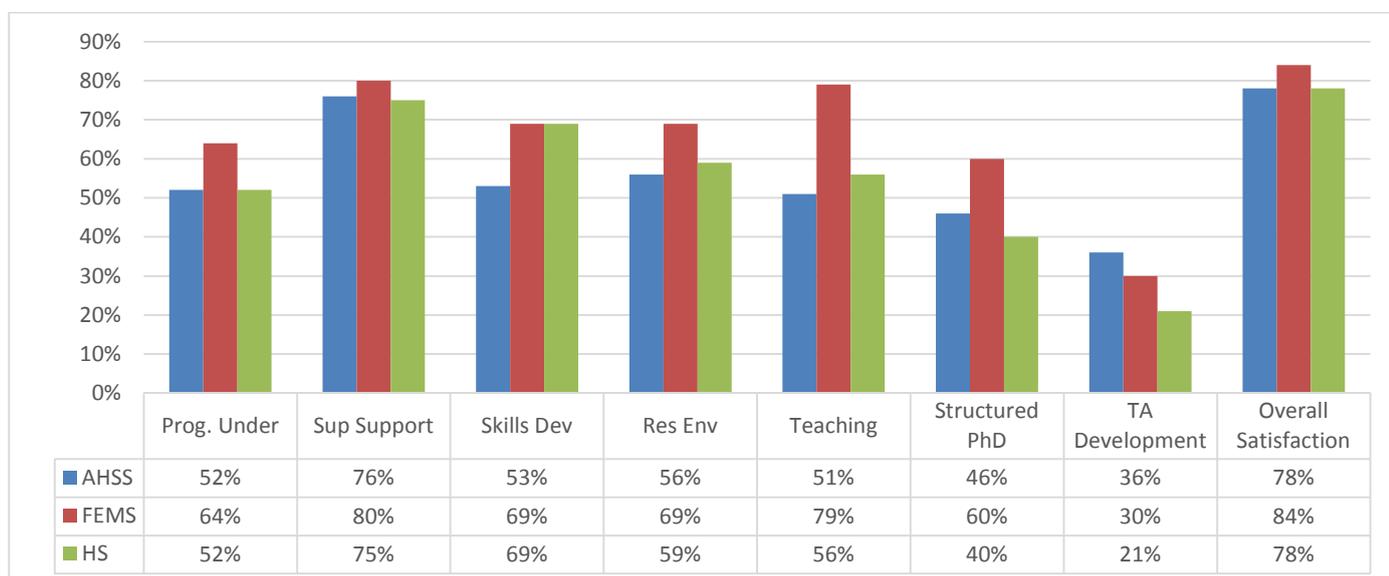 III. Funding;
  IV. Overall satisfaction.

Key findings:
- As of May 2017, Trinity College Dublin has 1505 PhD Students and 75 Research Masters students enrolled in research programmes.
- The survey attracted 445 (2016) and 448 (2017) responses representing a 26% response rate. Low response rate of Research Masters students means that data should not be taken as reliable for this cohort. In FEMS, 127 PhD and 8 Research Masters students partook in the survey.
- The opportunity to teach or demonstrate varies by Faculty - lowest in AHSS and highest in FEMS
- It is acknowledged that the frequency of supervision meetings is not an indicator of the quality of the supervision interaction. Students in FEMS are more likely to work in laboratory settings, as part of a team of postgraduate students, postdoctoral fellows working in close proximity to the Principal Investigator/Research Supervisor.
- A component of the experience of PGR students relates to the availability of non-financial

resources available to support the conduct of their research project e.g. work space/desk, computing facilities and specialist resources. This series of questions attracted strong scores from respondents but differences can be seen across Faculties with FEMS respondents being best served in terms of resources.
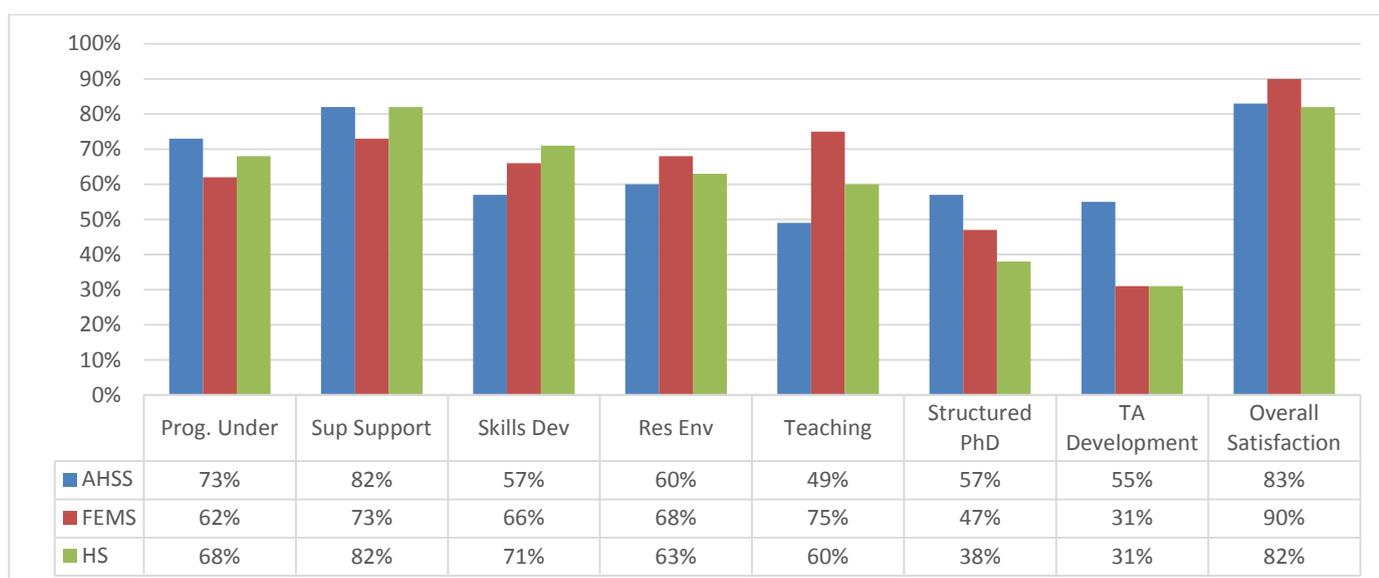
- FEMS students receive the highest level of external funding.
- Across Faculties the uptake of courses aimed at developing teaching and learning skills was highest in AHSS, followed by Health Sc. and lastly by FEMS. Efforts to increase the participation by PGR respondents in FEMS and Health Sc. in Graduate Teaching Programmes should be promoted as a measure to enhance the quality of the learning experience of undergraduate students on programmes where they teach or demonstrate.

The overall postgraduate student experience for 2016 and 2017 across the three Faculties of AHSS, FEMS and Health Sciences is seen below.

Faculty Summary 2016

	Prog. Under	Sup Support	Skills Dev	Res Env	Teaching	Structured PhD	TA Development	Overall Satisfaction
AHSS	52%	76%	53%	56%	51%	46%	36%	78%
FEMS	64%	80%	69%	69%	79%	60%	30%	84%
HS	52%	75%	69%	59%	56%	40%	21%	78%

Faculty Summary 2017

	Prog. Under	Sup Support	Skills Dev	Res Env	Teaching	Structured PhD	TA Development	Overall Satisfaction
AHSS	73%	82%	57%	60%	49%	57%	55%	83%
FEMS	62%	73%	66%	68%	75%	47%	31%	90%
HS	68%	82%	71%	63%	60%	38%	31%	82%

3.10 Collaborative and Transnational Education Provision

Name and Location of Partner Institution	Partnership Status	Programme Title[1] or Award type and NFQ level	Type of Partnership:	Awarding body	Brief description of agreement
Thapar	Operational	NFQ Level 8 BAI in Engineering BAI in Computer Science	Articulation Agreement	Trinity	Trinity signed an Articulation Agreement with Thapar University in July 2015. It is a 2+2 arrangement with Thapar University students entering Year 3 and 4 of Engineering and Computer Science Programmes in the Schools of Engineering and School of Computer Science. Students exit with a BAI Award and are eligible to study a further year for an MAI Award. Student number is 2016/17 =17
National des Sciences Appliquées (INSA) de Lyon	Operational			Dual	The School of Engineering, in collaboration with INSA, provide a Double Diploma Award Programme. In 2016/17 4 new incoming students commenced the programme and no Trinity students went outbound. Returning inbound students were enrolled in the final year of the Trinity BAI Engineering and 2Trinity students were enrolled in the final year of the INSA programme.
Masters in Development Practice	Operational	UCD	Collaborative	Joint	Masters in Development Practice is a joint award offered by School of Natural Sciences and UCD School of Politics and International Relations. Student numbers in 2016/17 =41